Magnesium

The concentration of dissolved magnesium in water from the lower Claiborne-upper Wilcox aquifer, based on the median values of all samples in each 100-square-mile area, ranges from 0.1 mg/L in west-central Mississippi to 467 mg/L in east-central Louisiana near the downdip limit of the aquifer (table 1). However, lines of equal concentration were not extended into the area of the upper range of the concentration because it was the only data point in a very large area of the aquifer. From about the Trinity River eastward to Alabama the concentration appears to have no trend (fig. 9). From the Trinity River southwestward to the Rio Grande the concentration decreases from the outcrop to the downdip limit of the data.

From the Sabine uplift eastward to southwestern Alabama the concentration of dissolved magnesium ranges from about 1 to about 10 mg/L in the outcrop area and from more than 0.10 to about 25 mg/L in the area from the outcrop to the downdip limit of the data. From the Sabine uplift southwestward to the San Marcos arch the concentration ranges from less than 5 to about 20 mg/L in the outcrop area and from less than 1 to about 20 mg/L in the area from the outcrop to the downdip limit of the data except for a small area downdip between the Trinity and Neches Rivers where the concentration exceeds 50 mg/L. From the San Marcos arch southwestward to the Rio Grande the concentration ranges from about 5 to more than 20 mg/L in the outcrop area and decreases in a downdip direction to less than 1 mg/L along the downdip limit of the data in southern Texas.

Sodium

The concentration of dissolved sodium in water from the lower Claiborne-upper Wilcox aquifer, based on the median values of all samples in each 100-square-mile area, ranges from 1.1 mg/L in an updip area in western Tennessee to 31,780 mg/L in east-central Louisiana near the downdip limit of the aquifer (table 1). However, lines of equal concentration were not extended into the area of the upper range of the concentration because it was the only data point in a very large area of the aquifer. The concentration generally increases from the outcrop area to the downdip limit of the data (fig. 10).

From the Sabine uplift eastward to southwestern Alabama the dissolved sodium concentration in the outcrop area ranges from less than 5 to about 100 mg/L and increases to more than 1,000 mg/L near the downdip limit of the data in western Mississippi and southern Arkansas. From the Sabine uplift southwestward to the San Marcos arch the concentration ranges from about 10 to more than 100 mg/L in the outcrop area and increases to about 500 mg/L near the Guadalupe River and the downdip limit of the data. From the San Marcos arch southwestward to the Rio Grande the concentration ranges from less than 50 to about 200 mg/L in the outcrop area and increases to more than 1,000 mg/L near the downdip limit of the data in southern Texas. Most of the areas having the largest concentration of dissolved sodium are coincident with the deeper part of the aquifer and with the location of salt domes (fig. 4).

Potassium

The concentration of dissolved potassium in water from the lower Claiborne-upper Wilcox aquifer, based on the median values of all samples in each 100-square-mile area, ranges from 0.2 mg/L in the outcrop area in northern Mississippi to 126 mg/L in east-central Louisiana near the downdip limit of the aquifer (table 1). However, lines of equal concentration were not extended into the area of the upper range of the concentration because there was only one data point in a very large area of the aquifer. For the aquifer area east of the Sabine uplift there appears to be an increase in concentration from the outcrop area to the downdip limit of the data. From the Sabine uplift southwestward to the San Marcos arch the concentration generally decreases from the outcrop area to the downdip limit of the data (fig. 11).

From the Sabine uplift eastward to southwestern Alabama the concentration of dissolved potassium generally ranges from 1 to 5 mg/L along the outcrop and increases to more than 10 mg/L in three areas along the downdip limit of the data. From the Sabine uplift southwestward to the San Marcos arch the concentration ranges from about 5 to less than 10 mg/L along the outcrop area and decreases to less than 5 mg/L along most of the area near the downdip limit of the data except an area near the Neches River where the concentration is more than 5 mg/L. From the San Marcos arch southwestward to the Rio Grande the concentration ranges from more than 5 mg/L along the outcrop area to less than 5 along the downdip limit of the data in the northeastern part of this area. Whereas in the southwestern part of this area the concentration ranges from less than 5 mg/L along the outcrop area to more than 5 mg/L along most of the area near the downdip limit of data.

Bicarbonate

The concentration of dissolved bicarbonate in water from the lower Claiborne-upper Wilcox aquifer, based on the median values of all samples in each 100-square-mile area, ranges from 4 mg/L in the outcrop area in east Texas to 1,760 mg/L near the downdip limit of the data in southern Texas (table 1). The concentration generally increases from the outcrop area to the downdip limit of the data (fig. 12).

From the Sabine uplift eastward to southwestern Alabama the concentration of dissolved bicarbonate in the outcrop area ranges from less than 20 mg/L in west Tennessee and north-central Mississippi to more than 200 mg/L in northern Arkansas. From the outcrop to the downdip limit of the data the concentration increases to more than 200 mg/L in most areas and to 1,000 mg/L in western Mississippi. From the Sabine uplift southwestward to the San Marcos arch the concentration ranges from 20 to more than 200 mg/L in the outcrop area and increases to more than 500 mg/L in several areas near the downdip limit of the data. From the San Marcos arch southwestward to the Rio Grande the concentration ranges from less than 100 to about 500 mg/L in the outcrop area and increases to more than 500 mg/L in most of the downdip area and to more than 1,000 mg/L near the downdip limit of the data in southern Texas.

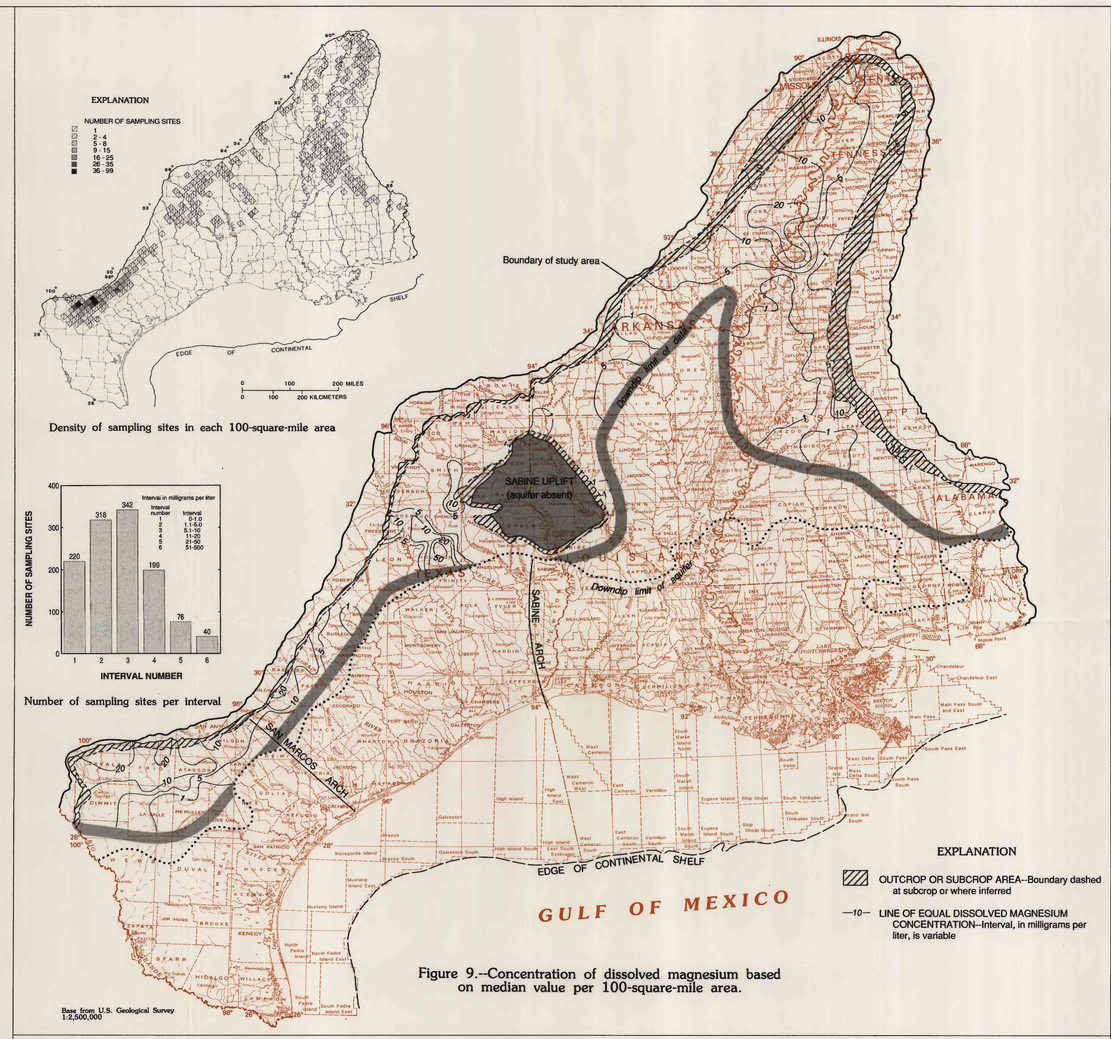

Figure 9.--Concentration of dissolved magnesium based on median value per 100-square-mile area.

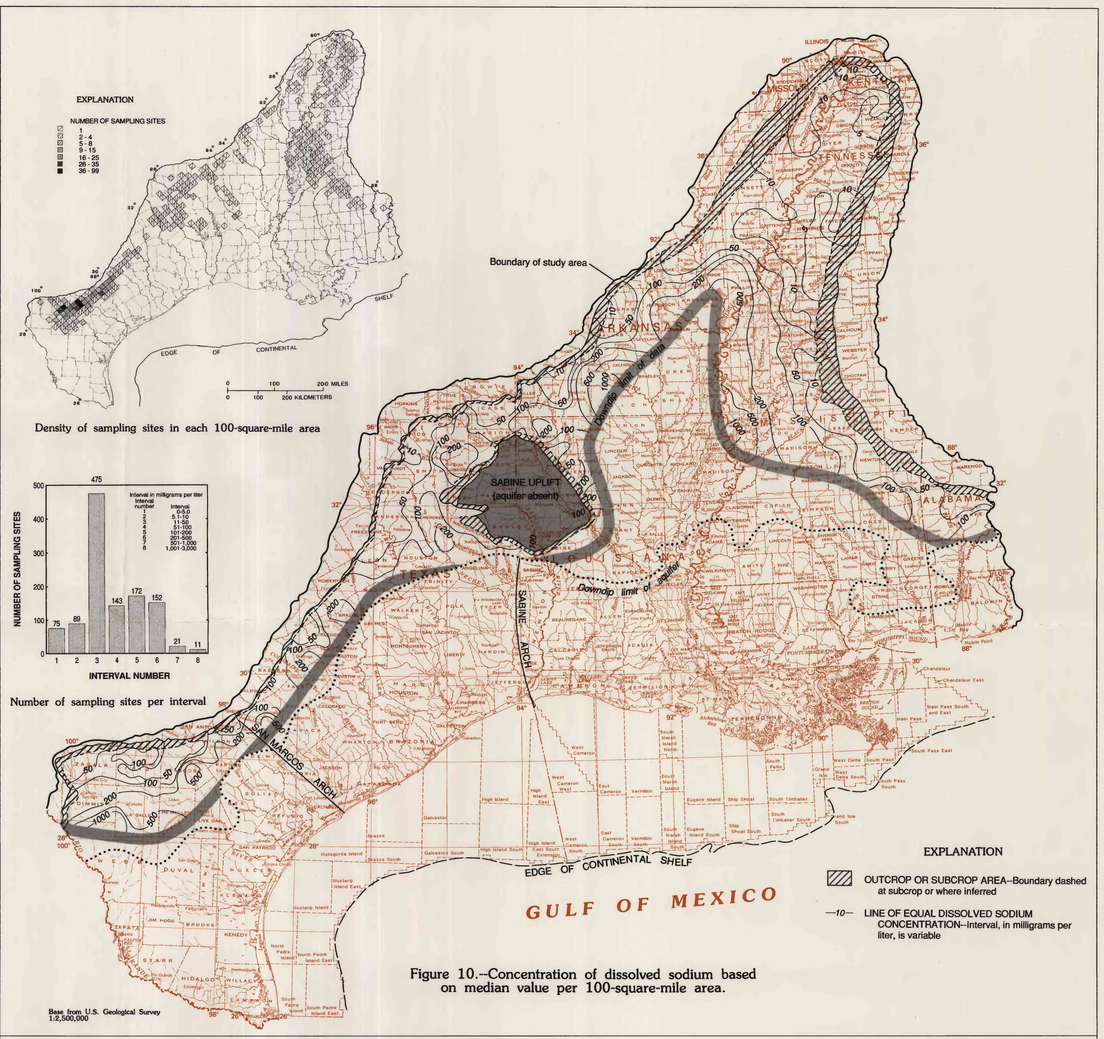

Figure 10.--Concentration of dissolved sodium based on median value per 100-square-mile area.

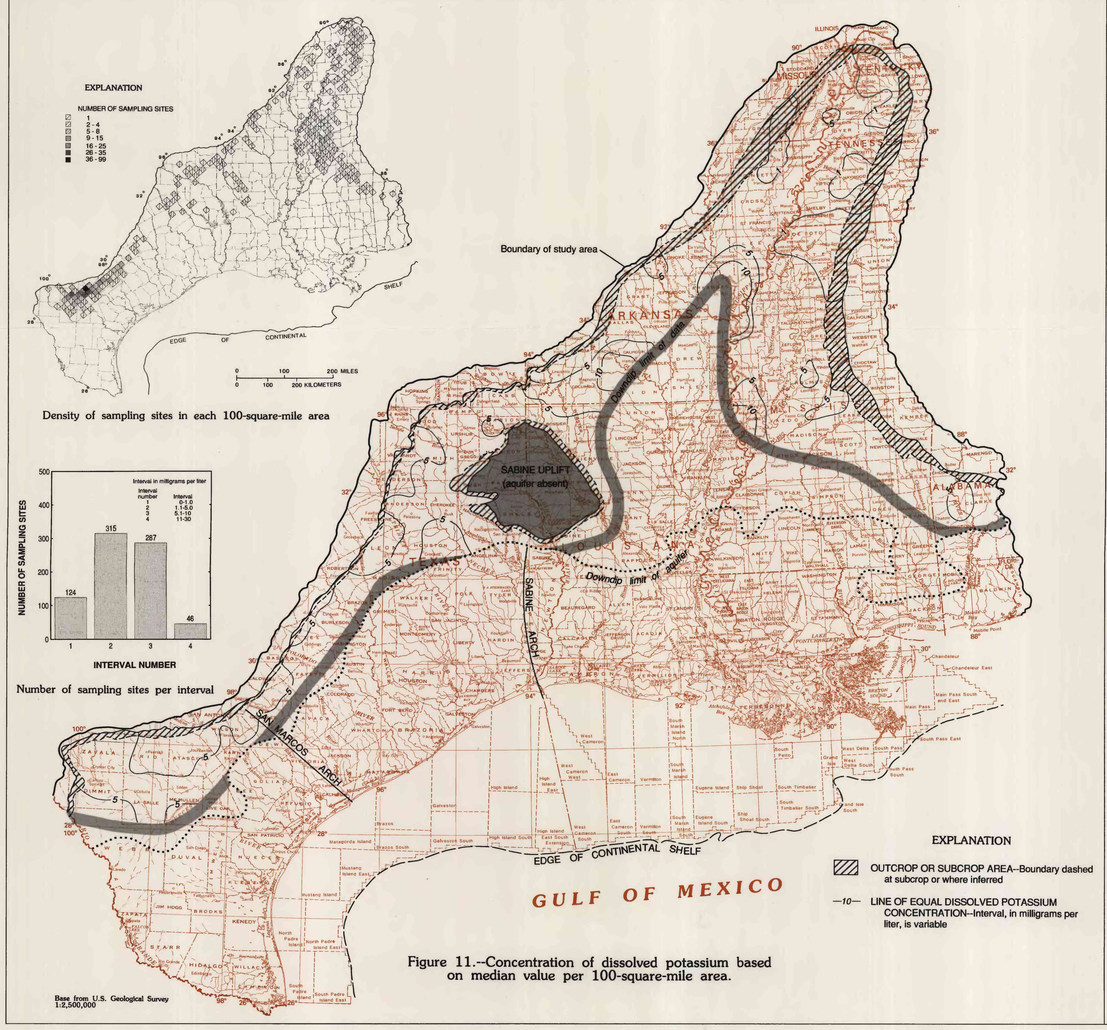

Figure 11.--Concentration of dissolved potassium based on median value per 100-square-mile area.

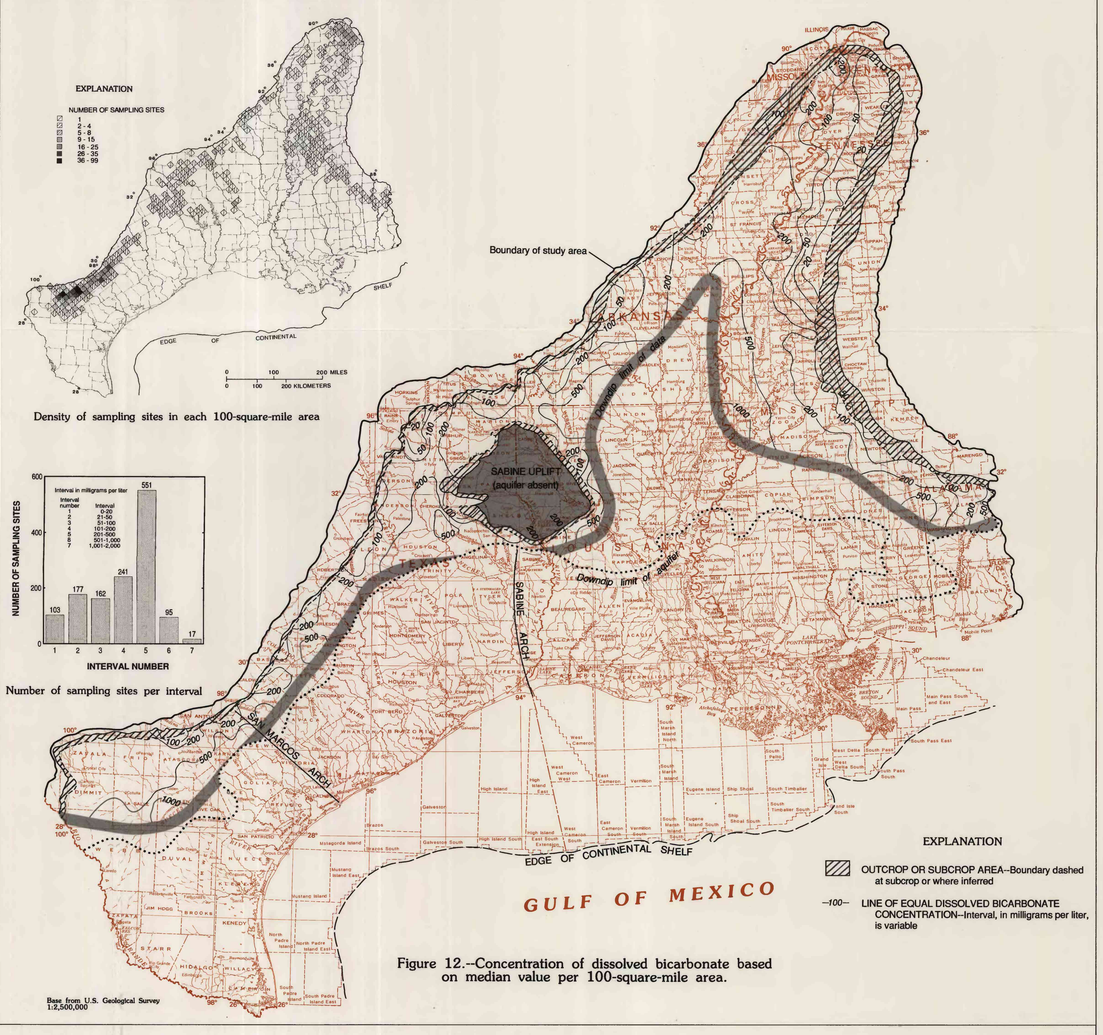

Figure 12.--Concentration of dissolved bicarbonate based on median value per 100-square-mile area.

SCALE 1:3 500 000
50 0 50 100 150 200 250 MILES
50 0 50 100 150 200 250 KILOMETERS

PROPERTIES AND CHEMICAL CONSTITUENTS IN GROUND WATER FROM THE LOWER CLAIBORNE-UPPER WILCOX AQUIFER, GULF COAST REGIONAL AQUIFER SYSTEMS, SOUTH-CENTRAL UNITED STATES

by

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